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Rocky Flats Plant

Monthly Environmental Monitoring Report

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RR-PP-00239



Rockwell International

Rocky Flats Plant
North American Space Operations
P.O. Box 464
Golden, Colorado 80402-0464

A Prime Contractor to
The United States Department of Energy

Reviewed for Classification/UCNI/OUO
By: Janet Nesheim, Derivative Classifier
DOE, EMCBC
Date: 11/17/08/06
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1/29

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SEPTEMBER 1987 ENVIRONMENTAL MONITORING REPORT
ROCKY FLATS PLANT

This report summarizes the effluent and environmental monitoring programs at the Rocky Flats Plant for the month of September, 1987.

Included in the report are monitoring results for radioactive and nonradioactive airborne effluents continuously sampled from Plant buildings, Tables I and II. Tables III through VI summarize environmental monitoring data from the Rocky Flats Plant ambient air sampling network. This network is comprised of continuously operating air samplers located on plantsite, around the Plant boundary, and in neighboring communities.

Water sampling results for radioactive constituents are given in Tables VII through IX. Results are summarized for Plant surface water control ponds, for nearby drinking water reservoirs, and for tap water for neighboring communities. Nitrate monitoring for Great Western Reservoir and Standley Lake, the two drinking water reservoirs which can receive surface water discharges from the Plant, are summarized in Table X.

The Environmental Protection Agency (EPA) has issued to the Plant a National Pollutant Discharge Elimination System (NPDES) permit for control of surface water discharges. Water sampling results associated with the NPDES permit, as well as applicable discharge limitations imposed by that permit, are reported in Table XI. Daily flow data for surface water from the two Plant drainage systems are given in Tables XII and XIII.

The Rocky Flats Plant Environmental Monitoring Program includes evaluating plant compliance with all relevant guides, limits, and standards. All average results of monitoring effluent and ambient samples complied with the applicable standards as specified in Executive Order 12088 (rules, regulations, and requirements of the Department of Energy).

The data provided in this report are provided as a matter of comity and should not be construed as an application for a permit or license, or in support of such an application. Approval of the Department of Energy should be obtained prior to publication of any data contained within this report.

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Name/Org: Sgt. J.A. /mc Date 11/17/08
Directed by: J.A. Nestheim DOE M471.3-1

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Table I. 1987 Plutonium and Uranium Airborne Effluent Data

Month	Plutonium		Uranium	
	Release (uCi)	CMax (pCi/m ³)	Release (uCi)	CMax (pCi/m ³)
CY 1986	14.33	0.047 ± 0.0082	21.24	0.133 ± 0.0152
January	1.39	0.095 ± 0.0155	2.15	0.017 ± 0.0013
February	0.89	0.071 ± 0.0081	1.99	0.095 ± 0.0091
March	1.84	0.229 ± 0.0278	1.12	0.005 ± 0.0004
April	2.02	0.016 ± 0.0013	0.87	0.004 ± 0.0005
May	1.28	0.104 ± 0.0175	0.94	0.003 ± 0.0004
June	0.69*	0.005 ± 0.0012	0.98	0.003 ± 0.0004
July	1.22	0.019 ± 0.0021	1.21	0.004 ± 0.0005
August	0.65	0.010 ± 0.0011	1.91	0.006 ± 0.0008
September	0.63	0.003 ± 0.0003	1.31	0.004 ± 0.0003
October				
November				
December				
Year to Date	10.61	0.229 ± 0.0278	12.48	0.095 ± 0.0091

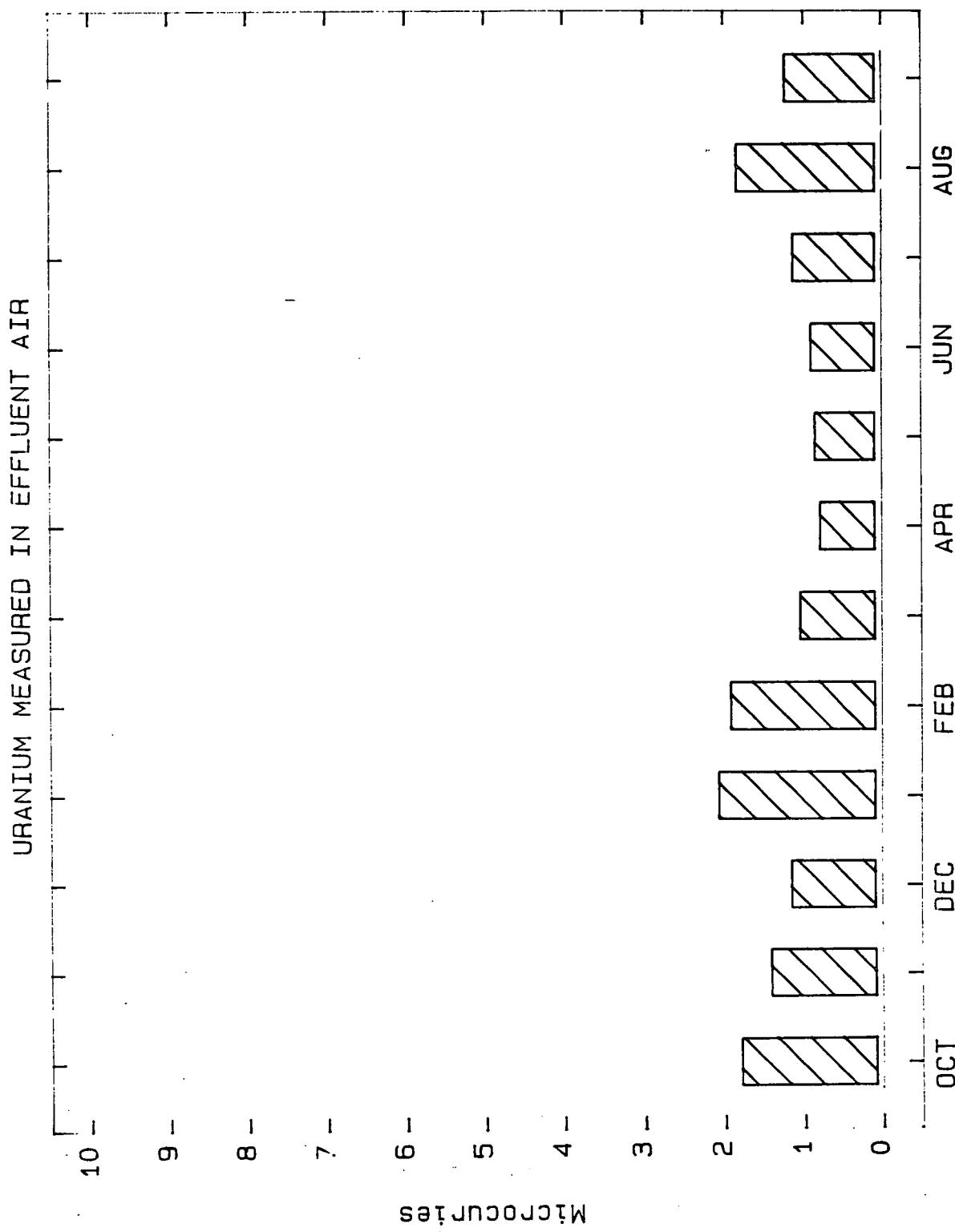
NOTE: Beginning in January 1981, the plutonium, uranium, americium, and beryllium measured concentrations have been reported. These reported concentrations include values that are less than the corresponding calculated MDC's and in some cases, values less than zero. These negative values result when the measured value for the laboratory reagent blank is subtracted from an analytical result which was measured as a smaller value than the reagent blank. This may happen when measuring concentrations which are very close to zero.

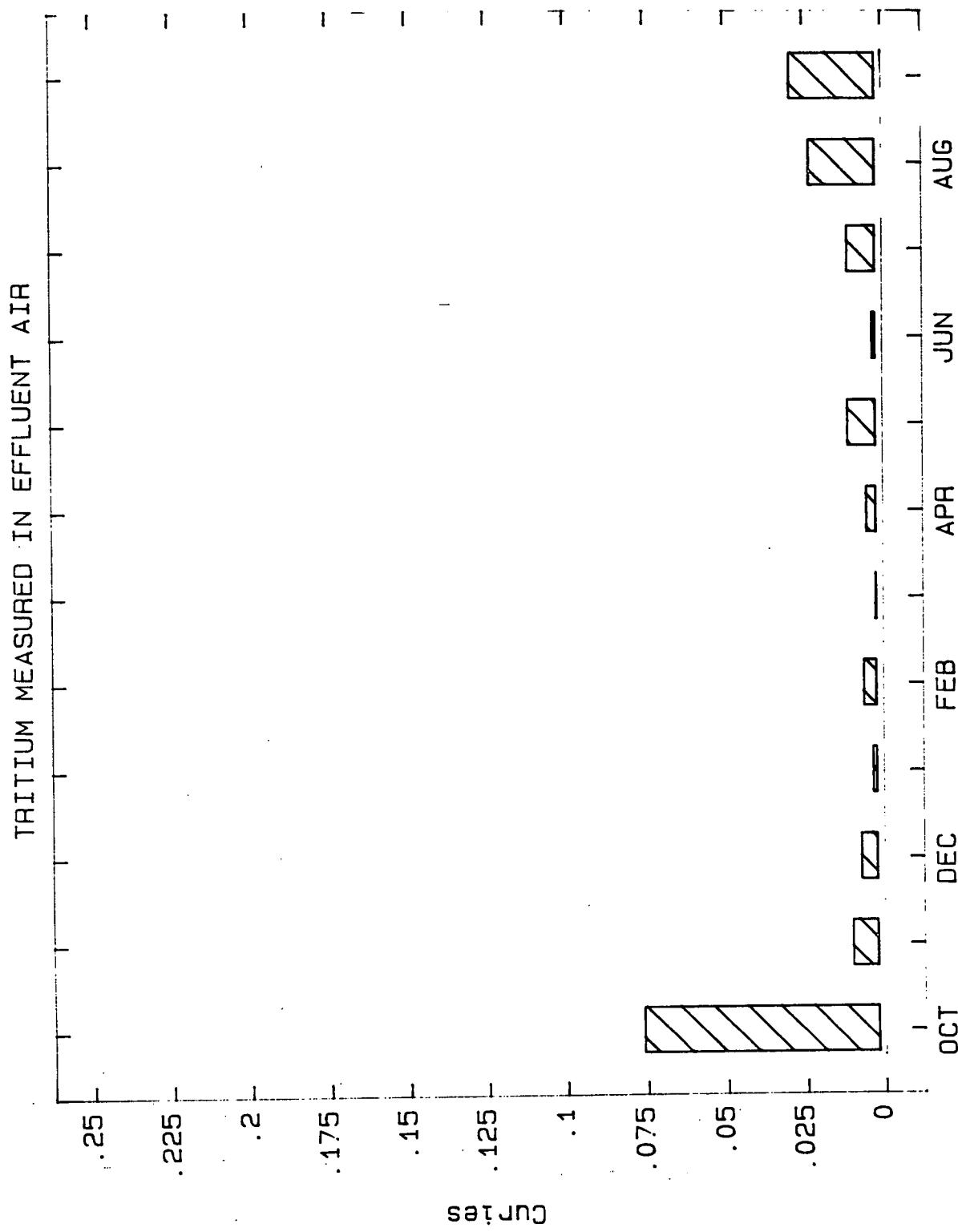
* Estimated June plutonium emissions are included for 12 of 37 sampling locations because of low chemical recoveries for those samples. Estimated June plutonium emissions are based on measured air emissions for 25 sampling locations (contributing 0.60 uCi total) and six-month averages for the 12 affected locations (contributing an additional 0.09 uCi total).

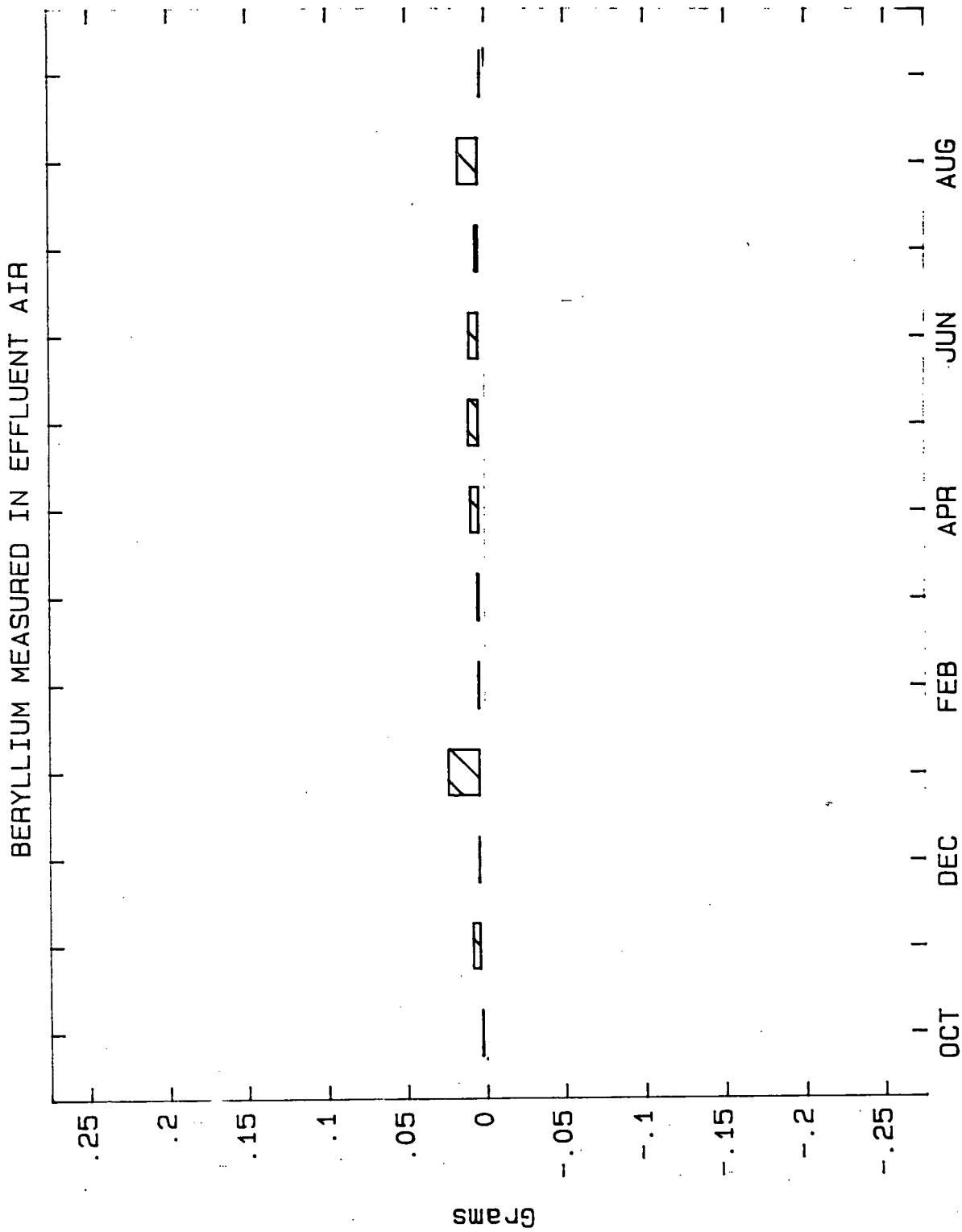
Table II. 1987 Tritium and Beryllium Airborne Effluent Data

<u>Month</u>	<u>Tritium</u>		<u>Beryllium</u>	
	<u>Release (Ci)</u>	<u>CMax (pCi/m3)</u>	<u>Release (gms)</u>	<u>CMax (ug/m3)</u>
CY 1986	0.218	36700 ± 950	0.1299	0.00053
January	0.005	410 ± 180	0.0276	0.00042
February	0.008	250 ± 80	0.0085	0.00006
March	0.004	470 ± 180	0.0091	0.00014
April	0.007	270 ± 60	0.0130	0.00010
May	0.013	560 ± 210	0.0143	0.00011
June	0.005	260 ± 60	0.0137	0.00014
July	0.013	420 ± 160	0.0099	0.00008
August	0.025	3402 ± 570	0.0207	0.00021
September	0.031	8580 ± 900	0.0048	0.00004
October				
November				
December				
Year to Date	0.111	8580 ± 900	0.1216	0.00042

NOTE: Beryllium measured at the remaining 36 locations was below the screening level of 0.1 gram per month.







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Table III. Plutonium at Selected Onsite Ambient Air Locations
(08/25/87-09/22/87)

<u>Location</u>	<u>n</u>	<u>Volume(m³)</u>	<u>Concentration (pCi/m³)</u>		
			<u>Lower Confidence Limit</u>	<u>Point Estimate</u>	<u>Upper Confidence Limit</u>
S-05	2	19,000	0.000029	0.000038	0.000047
S-06	2	30,000	0.000005	0.000010	0.000015
S-07	2	30,000	0.000190	0.000218	0.000246
S-08	2	28,000	0.000696	0.000776	0.000856
S-09	2	34,000	0.000362	0.000405	0.000448

NOTE: Total long-lived alpha at the remaining 18 onsite ambient air samplers was below the screening level of 0.01 pCi/m³.

Table IV. Tritium in Ambient Air
(09/01/87 to 09/29/87)

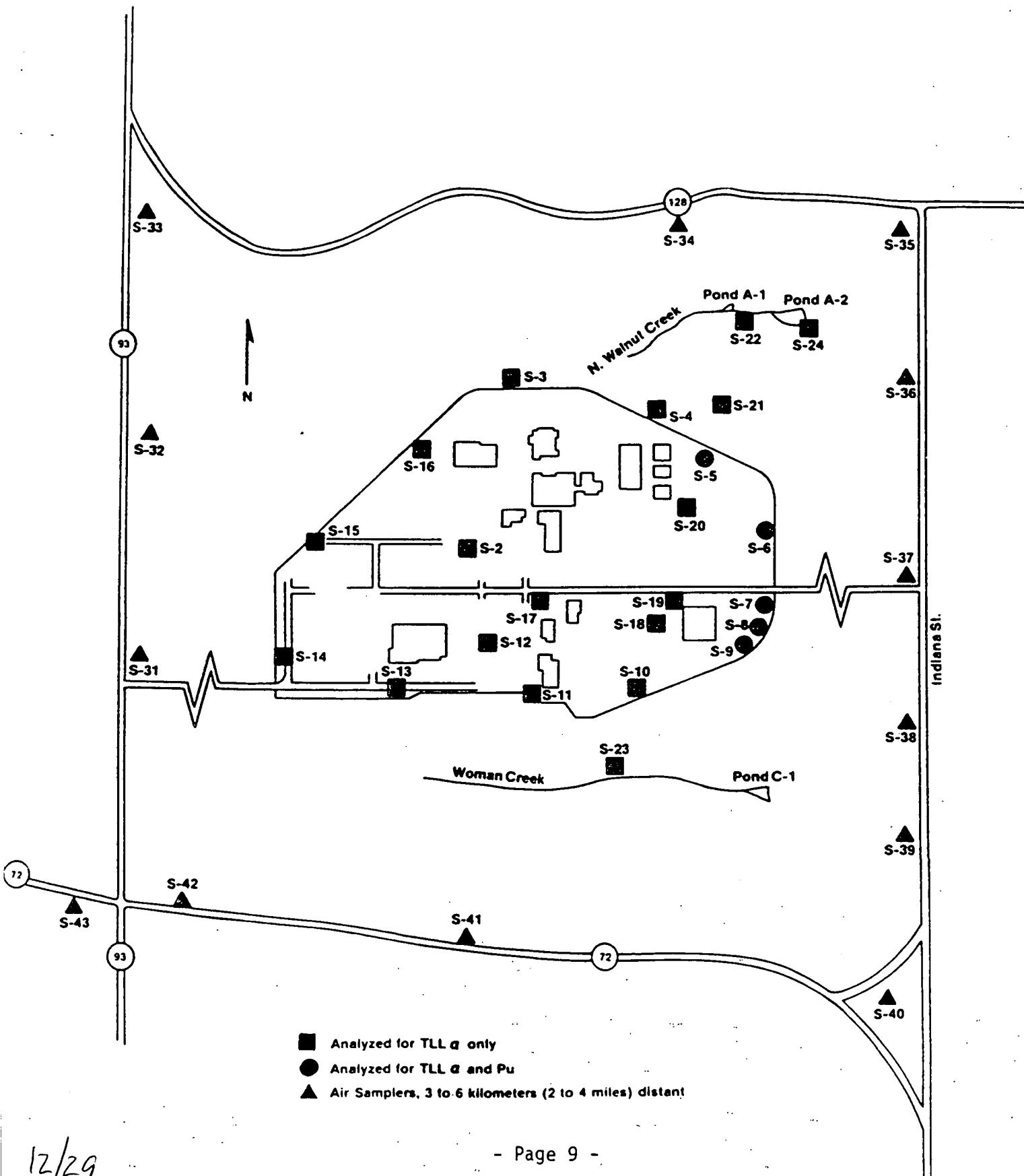
<u>Location</u>	<u>n</u>	<u>Air Volume(m³)</u>	<u>Point Estimate (pCi/m³)</u>	<u>+/- Error (pCi/m³)</u>	<u>Condensed Water Vapor (mls)</u>
S-4	4	39	0.07	0.83	76
S-5	4	53	0.60	1.26	152
S-16	3	45	0.68	1.09	114

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Table V. Plutonium in Perimeter Ambient Air
(09/01/87-09/29/87)

<u>Location</u>	<u>n</u>	<u>Volume(m³)</u>	Concentration(pCi/m ³)		
			<u>Lower Confidence Limit</u>	<u>Point Estimate</u>	<u>Upper Confidence Limit</u>
S-31	1	28,000	0.000004	0.000006	0.000008
S-32	1	22,000	-0.000002	0.000001	0.000004
S-33	1	27,000	-0.000003	-0.000001	0.000001
S-34	1	23,000	0.000002	0.000005	0.000008
S-35	1	21,000	0.000000	0.000003	0.000006
S-36	1	27,000	0.000002	0.000004	0.000006
S-37	1	29,000	0.000005	0.000008	0.000011
S-38	1	28,000	0.000015	0.000018	0.000021
S-39	1	28,000	0.000001	0.000003	0.000005
S-40	1	21,000	0.000007	0.000010	0.000013
S-41	1	30,000	0.000006	0.000008	0.000010
S-42	1	29,000	-0.000003	-0.000001	0.000001
S-43	1	30,000	0.000002	0.000004	0.000006
S-44	1	27,000	0.000001	0.000003	0.000005
Mean Point Estimate =			0.000005		

Location of Onsite and Plant Perimeter Ambient Air Samplers
 (Portions of figure are not to scale.)



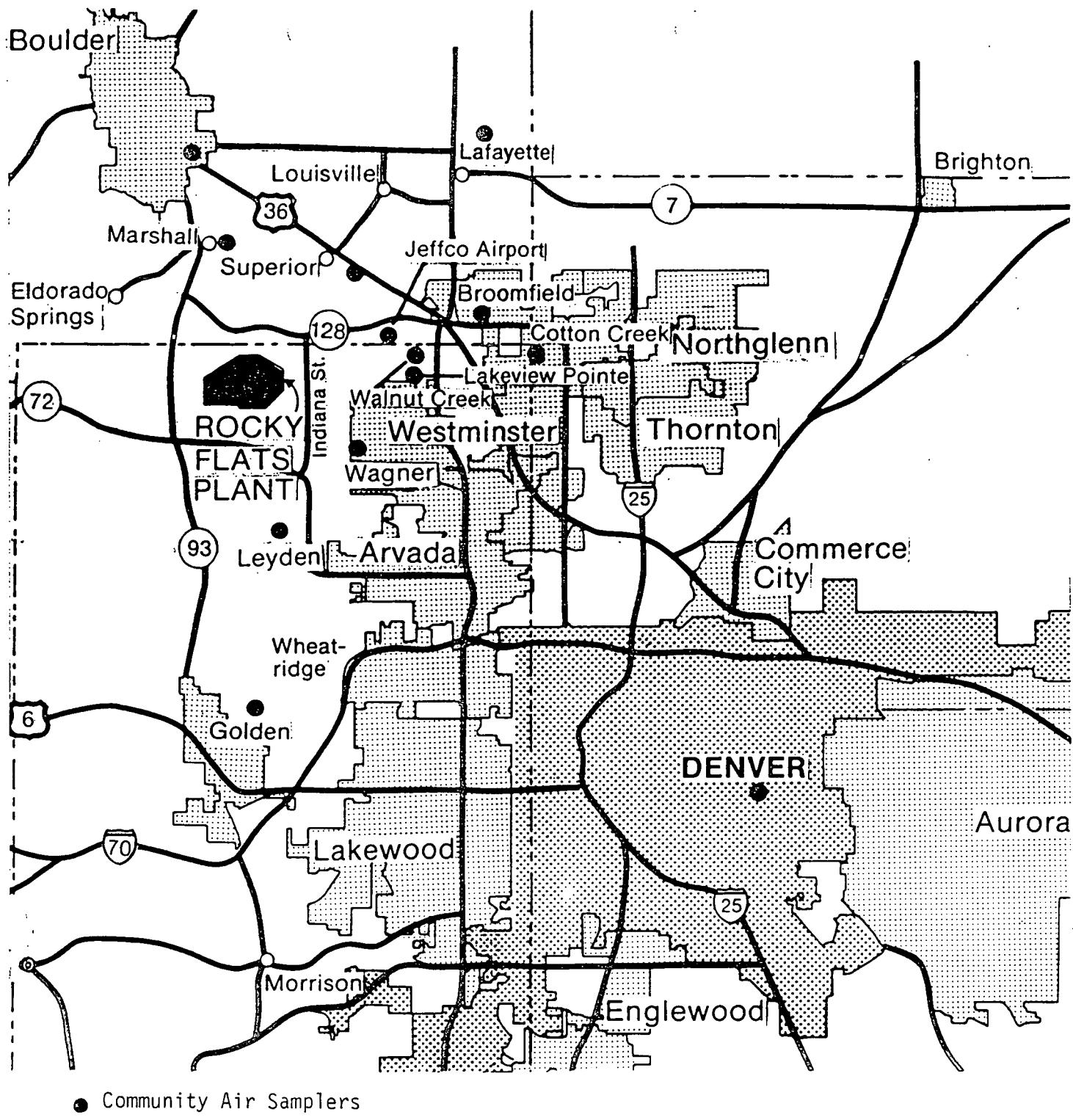
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Table VI. Plutonium in Community Ambient Air
(09/02/87-09/30/87)

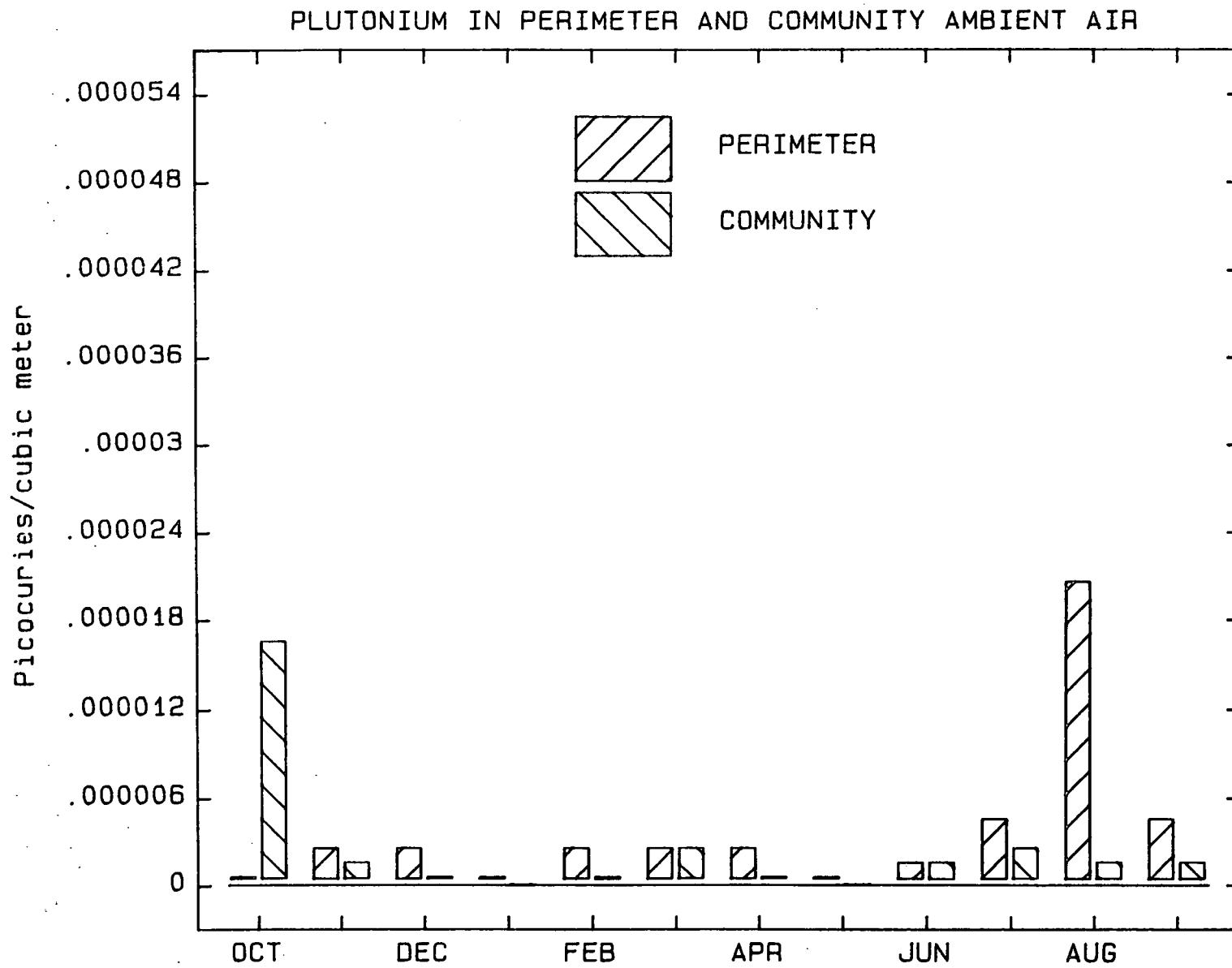
<u>Location</u>	<u>n</u>	<u>Volume(m³)</u>	<u>Concentration(pCi/m³)</u>		
			<u>Lower Confidence Limit</u>	<u>Point Estimate</u>	<u>Upper Confidence Limit</u>
Marshall	1	25,000	-0.000001	0.000001	0.000003
Jeffco Airport	1	25,000	0.000000	0.000003	0.000006
Superior	1	26,000	-0.000003	-0.000001	0.000001
Boulder	1	26,000	-0.000001	0.000001	0.000003
Lafayette	1	24,000	-0.000003	0.000000	0.000003
Broomfield	1	20,000	0.000005	0.000008	0.000011
Walnut Creek	1	29,000	0.000001	0.000003	0.000005
Wagner	1	28,000	0.000001	0.000003	0.000005
Leyden	1	23,000	-0.000002	0.000001	0.000004
Westminster	1	18,000	-0.000005	-0.000002	0.000001
Denver*	1	11,000	-0.000002	0.000003	0.000008
Golden	1	28,000	0.000004	0.000007	0.000010
Lakeview Pointe	1	22,000	-0.000001	0.000002	0.000005
Cotton Creek	1	24,000	0.000002	0.000005	0.000008
Mean Point Estimate				0.000002	

* Denver sampling location inaccessible from 9/16/87 to 9/30/87 due to construction activities at the U.S. Customs House Building.



Location of Community Ambient Air Samplers

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Table VII. Water Sample Results, Radioactive Parameters

Holding Pond Outfall (pCi/l)

<u>Location</u>	<u>Plutonium</u>	<u>Uranium</u>	<u>Americium</u>
-----------------	------------------	----------------	------------------

Pond A-4

NO DISCHARGE

Pond B-5

09/10/87 - 09/11/87	0.00 \pm 0.03	2.7 \pm 0.3	-0.01 \pm 0.02
Average Concentration	0.00 \pm 0.03	2.7 \pm 0.3	-0.01 \pm 0.02

Pond C-1

08/28/87 - 09/04/87	0.01 \pm 0.03	3.2 \pm 0.3	0.002 \pm 0.007
09/11/87 - 09/18/87	0.02 \pm 0.03	3.6 \pm 0.4	0.009 \pm 0.005
09/18/87 - 09/25/87	0.03 \pm 0.01	4.3 \pm 0.5	0.00 \pm 0.02
09/25/87 - 10/02/87	0.04 \pm 0.01	3.4 \pm 0.5	0.02 \pm 0.02
Average Concentration	0.03 \pm 0.01	3.6 \pm 0.2	0.008 \pm 0.01

Pond C-2

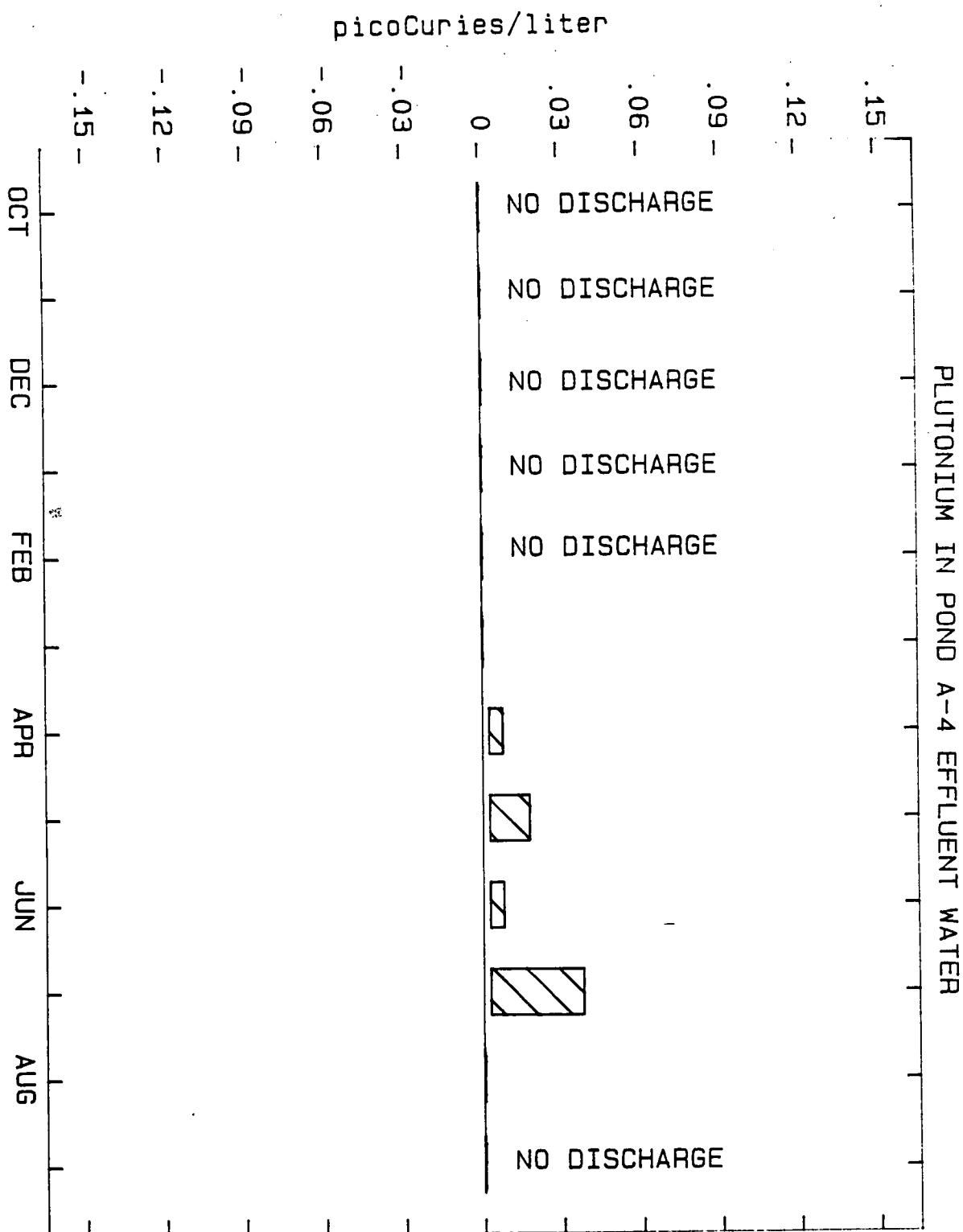
09/10/87 - 09/11/87	0.05 \pm 0.03	3.8 \pm 0.04	0.03 \pm 0.02
Average Concentration	0.05 \pm 0.03	3.8 \pm 0.04	0.03 \pm 0.02

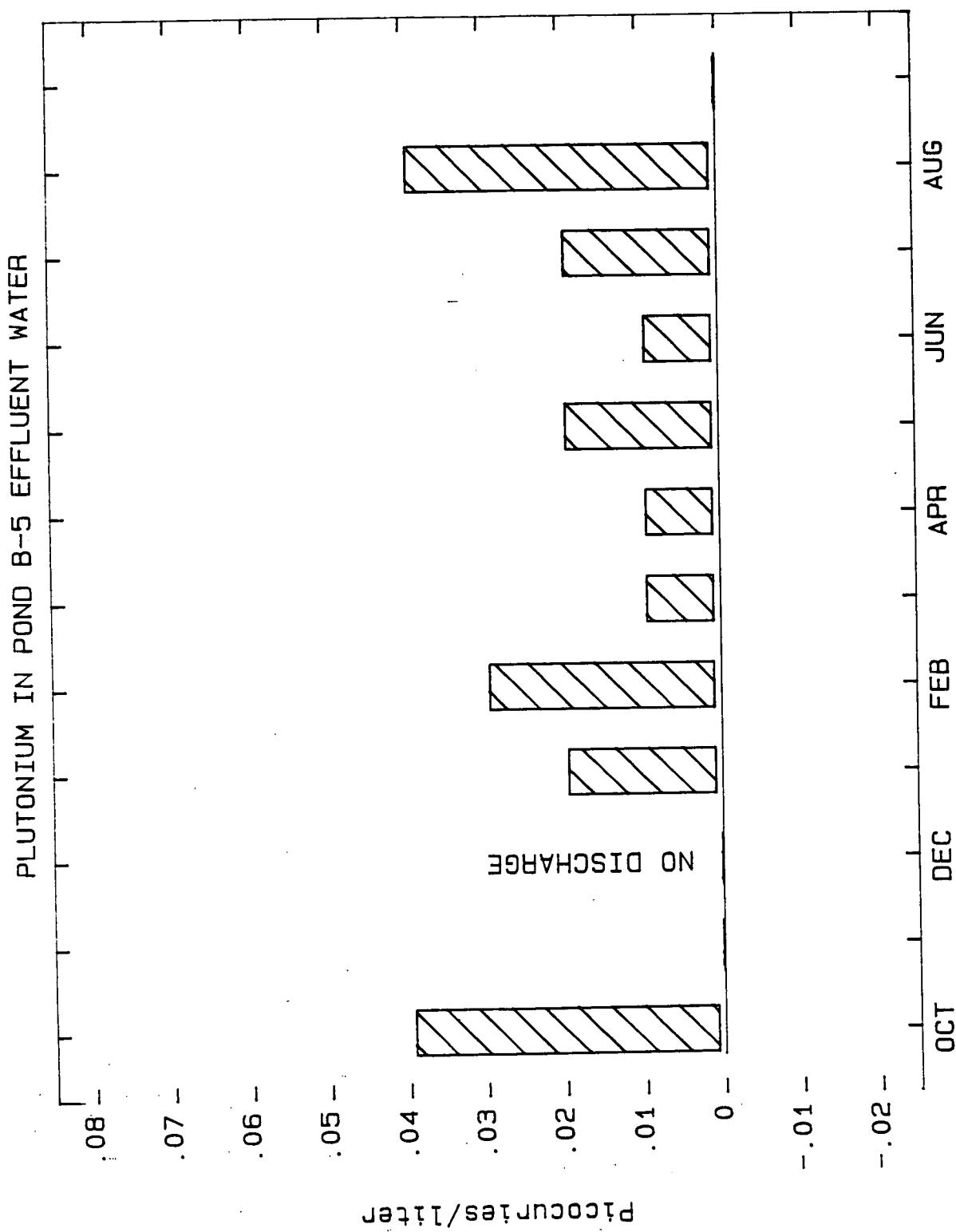
Walnut Creek at Indiana

09/04/87 - 09/11/87	0.01 \pm 0.01	6.1 \pm 0.6	-0.004 \pm 0.009
09/11/87 - 09/18/87	-0.02 \pm 0.05	2.5 \pm 0.3	0.02 \pm 0.02
09/18/87 - 09/25/87	-----	No Flow-----	
09/25/87 - 10/02/87	-----	No Flow-----	
Average Concentration	-0.01 \pm 0.04	4.3 \pm 0.3	0.01 \pm 0.01

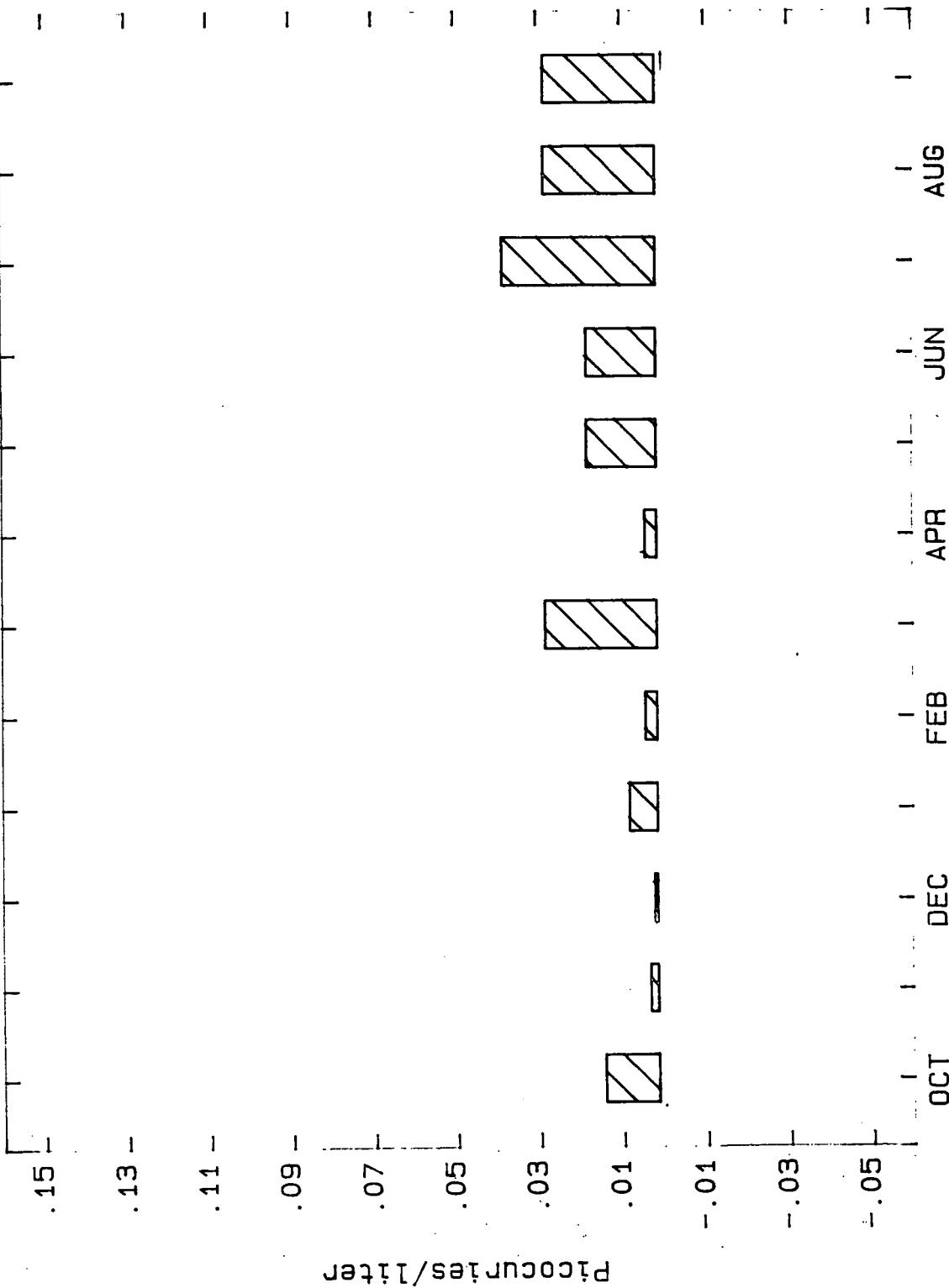
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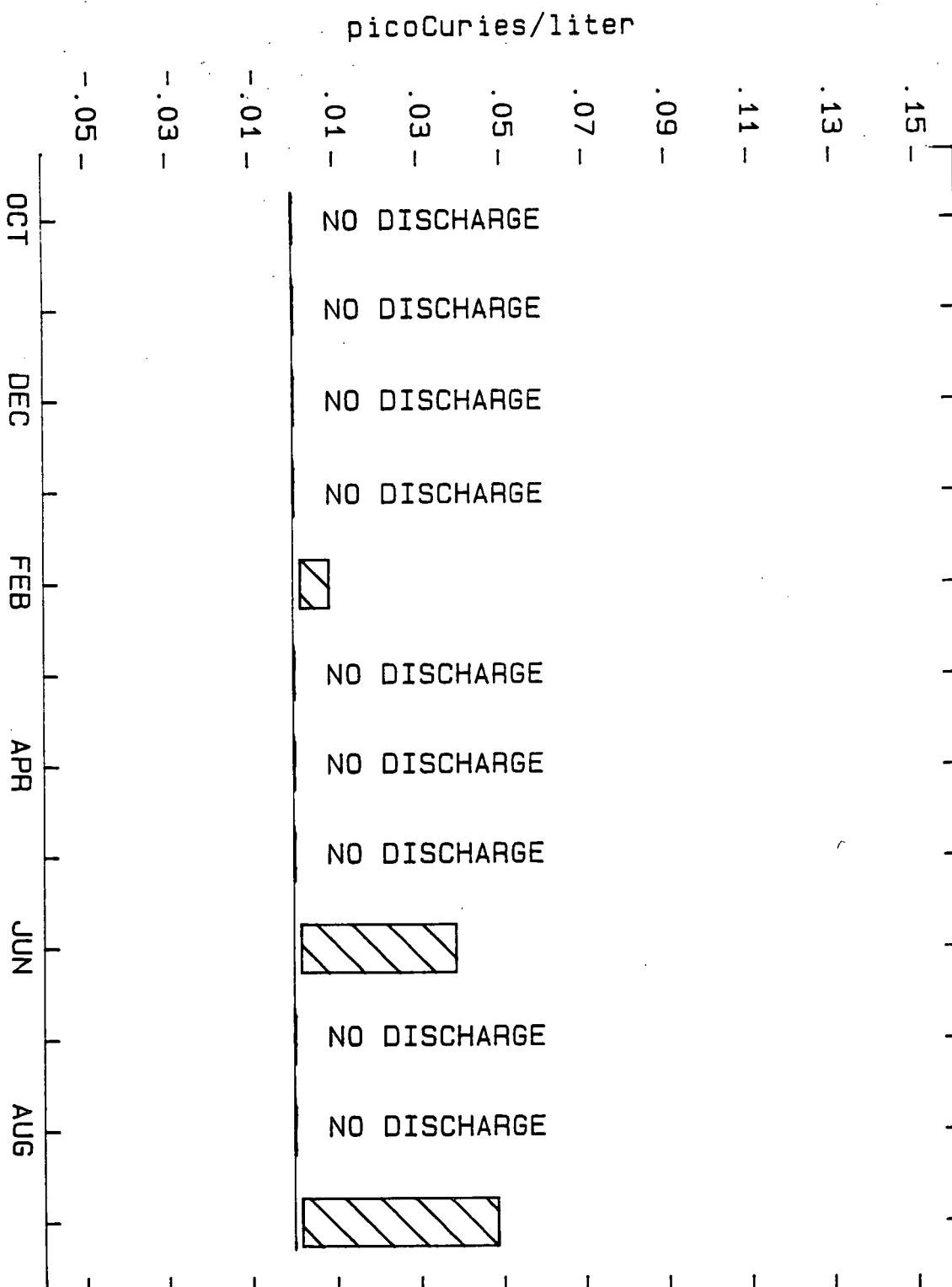
PLUTONIUM IN POND C-1 EFFLUENT WATER

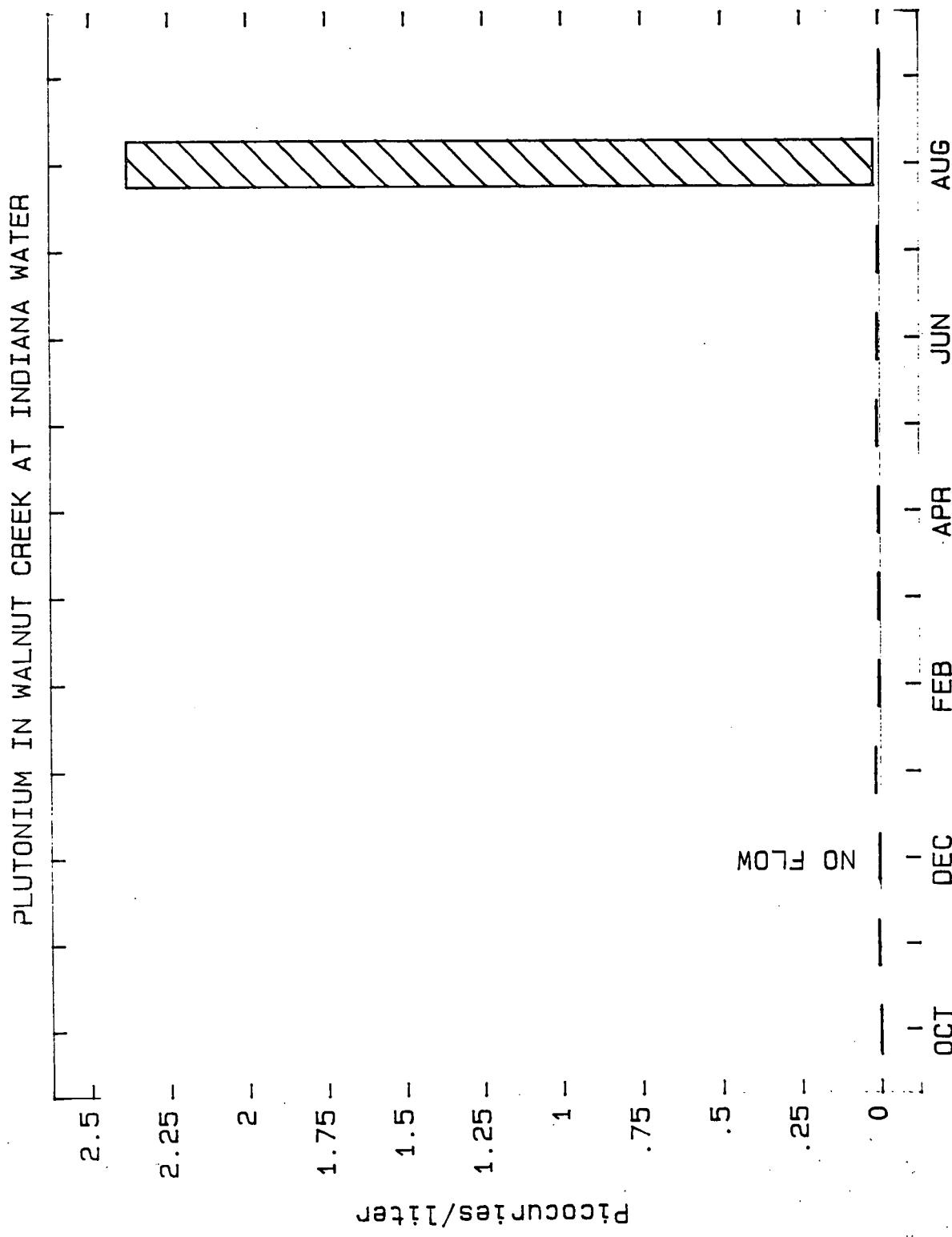


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PLUTONIUM IN POND C-2 EFFLUENT WATER





AUGUST 1987

Table VIII. Water Sample Results, Radioactive Parameters

Reservoirs (pCi/l)

<u>Location</u>	<u>n</u>	<u>Plutonium</u>	<u>Uranium</u>	<u>Americium</u>
Great Western	1*	0.003 \pm 0.007	2.0 \pm 0.2	-0.001 \pm 0.005
Standley	1*	0.000 \pm 0.006	1.2 \pm 0.2	0.008 \pm 0.005

Community Tap Water (pCi/l)

<u>Location</u>	<u>n</u>	<u>Plutonium</u>	<u>Uranium</u>	<u>Americium</u>
Boulder	1*	-0.002 \pm 0.006	-0.01 \pm 0.08	0.007 \pm 0.006
Broomfield	1*	0.000 \pm 0.006	0.8 \pm 0.1	0.009 \pm 0.006
Denver	1	-0.01 \pm 0.03	0.4 \pm 0.1	0.02 \pm 0.02
Golden	1	0.01 \pm 0.03	0.6 \pm 0.1	0.00 \pm 0.02
Lafayette	1	-0.02 \pm 0.02	0.2 \pm 0.1	0.01 \pm 0.02
Louisville	1	-0.01 \pm 0.03	0.0 \pm 0.1	0.04 \pm 0.02
Thornton	1	0.00 \pm 0.03	4.4 \pm 0.5	0.04 \pm 0.02
Westminster	1*	-0.002 \pm 0.006	0.1 \pm 0.1	0.000 \pm 0.005

* Plutonium, uranium and americium analyses were performed on one sample composited from four weekly grab samples. All other analyses were performed on quarterly grab samples.

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Table IX. Water Sample Results, Radioactive Parameters

Tritium (pCi/l)

<u>Location</u>	<u>n</u>	<u>C_{Minimum}</u>	<u>C_{Maximum}</u>	<u>C_{Average}</u>
Pond A-4	0		No Discharge	
Pond B-5	2	200 + 400	600 + 400	400 + 300
Pond C-1	3	-900 + 400	500 + 400	-200 + 200
Pond C-2	2	300 + 400	500 + 400	400 + 300
Walnut Creek at Indiana	1	-800 + 400	-800 + 400	-800 + 400
Arvada	1	600 + 400	600 + 400	600 + 400
Boulder	4	0 + 400	800 + 400	300 + 200
Broomfield	4	-200 + 400	300 + 400	100 + 200
Denver	1	-100 + 400	-100 + 400	-100 + 400
Golden	1	-100 + 400	-100 + 400	-100 + 400
Great Western	4	100 + 400	500 + 400	200 + 200
Lafayette	1	700 + 400	700 + 400	700 + 400
Louisville	1	500 + 400	500 + 400	500 + 400
Standley	4	0 + 400	300 + 400	100 + 200
Thornton	1	300 + 400	300 + 400	300 + 400
Westminster	4	-200 + 400	300 + 400	100 + 200

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Table X. Water Sample Results, Nonradioactive Parameters

Nitrate (as N) at Great Western Reservoir

<u>Sample Date</u>	<u>Nitrate (as N) (mg/l)</u>
09/03/87	<0.2
09/10/87	<0.2
09/17/87	<0.2
09/24/87	<0.2

Nitrate (as N) at Standley Lake

<u>Sample Date</u>	<u>Nitrate (as N) (mg/l)</u>
09/03/87	<0.2
09/10/87	<0.2
09/17/87	<0.2
09/24/87	<0.2

NOTE: For some parameters, the concentrations that are measured at or below the minimum detectable concentration (MDC) are assigned to MDC. The less than symbol (<) indicates MDC values and calculated values that include one or more MDC's.

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Table XI. NPDES Permit Water Sample Results

Discharge 001 (Pond B-3)

No Discharge

Parameter		30-Day Average	Limits 30-Day* Average	Daily Maximum	Limits Daily Maximum
Biochem. Oxygen Demand, 5 Day	mg/l		10		25
Total Suspended Solids	mg/l		30		NA
Nitrates as N	mg/l		10		NA
Total Chromium	mg/l		0.05		0.1
Total Phosphorus	mg/l		8		NA
Oil and Grease, Visual			NA		NA
Total Residual Chlorine	mg/l		NA		0.5
Fecal Coliforms	#/100 ml		200		NA
pH	S.U.	Minimum	Minimum	Maximum	Limits Maximum
			6.0		9.0

Discharge 002 (Pond A-3)

Discharged one time

Parameters		30-Day Average	Limits 30-Day* Average	Daily Maximum	Limits Daily Maximum
Nitrates as N	mg/l	1.8	10	1.8	20
pH	S.U.	Minimum	Minimum	Maximum	Maximum
		7.5	6.0	7.5	9.0

Discharge 003 (RO Pilot Plant)

No Discharge

		Limits	Limits
pH	S.U.	Minimum	Minimum
		6.0	9.0

* This limitation applies when a minimum of 3 consecutive samples are taken during separate weeks.

Tables XI. NPDES Permit Water Sample Results (Continued)

Discharge 004 (RO Plant)

No Discharge		<u>Limits</u>		<u>Limits</u>	
		30-Day Average	30-Day* Average	Daily Maximum	Daily Maximum
Total Suspended Solids	mg/l		15		25
Total Organic Compounds	mg/l		22		30
Total Phosphorus	mg/l		8		12
Nitrates as N	mg/l		10		20
Total Chromium	mg/l		0.05		0.1
Total Residual Chlorine	mg/l		NA		0.5
Fecal Coliform	#/100 ml	7-Day Average	7-Day Average	30-Day Average	30-Day Average
pH	S.U.		400		200
		<u>Minimum</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Maximum</u>
			6.0		9.0

Discharge 005 (Pond A-4)

No Discharge		n	<u>C_{Minimum}</u>	<u>C_{Maximum}</u>	<u>C_{Average}</u>
Parameter					
pH	S.U.				
Nitrates as N	mg/l				
Nonvolatile	mg/l				
Suspended Solids					

Discharge 006 (Pond B-5)

Discharged two times		n	<u>C_{Minimum}</u>	<u>C_{Maximum}</u>	<u>C_{Average}</u>
Parameter					
pH	S.U.	2	7.7	8.1	-
Nitrates as N	mg/l	2	<0.2	1.3	<0.8
Nonvolatile	mg/l	2	0.0	0.0	0.0
Suspended Solids					

Discharge 007 (Pond C-2)

Discharged two times		n	<u>C_{Minimum}</u>	<u>C_{Maximum}</u>	<u>C_{Average}</u>
Parameter					
pH	S.U.	2	8.0	8.1	-
Nitrates as N	mg/l	2	<0.2	<0.2	<0.2
Nonvolatile	mg/l	2	1.0	7.0	4.0
Suspended solids					

Table XII. Water Sample Results, Nonradioactive Parameters

Walnut Creek at Indiana Street

<u>Parameter</u>		<u>n</u>	<u>C_{Minimum}</u>	<u>C_{Maximum}</u>	<u>C_{Average}</u>
pH	S.U.	3	7.8	7.9	-
Nitrates as N	mg/l	3	<0.2	1.0	<0.7

Total Volume (gallons) = 5,840,000

(33)

Table XII.
Daily Flow Data Recorded at the
Walnut Creek at Indiana Gauging Station,
Ponds A-4 and B-5 during September, 1987

<u>Date</u>	<u>Walnut Creek at Indiana (gallons)</u>	<u>Pond A-4 (gallons)</u>	<u>Pond B-5 (gallons)</u>
9/01/87	-	-	-
9/02/87	-	-	-
9/03/87	-	-	-
9/08/87	-	-	-
9/09/87	-	-	-
9/10/87	-	-	2,527,000
9/11/87	4,246,000	-	564,000
9/14/87	1,594,00	-	-
9/15/87	-	-	-
9/16/87	-	-	-
9/17/87	-	-	-
9/18/87	-	-	-
9/21/87	-	-	-
9/22/87	-	-	-
9/23/87	-	-	-
9/24/87	-	-	-
9/25/87	-	-	-
9/28/87	-	-	-
9/29/87	-	-	-
9/30/87	-	-	-
 Total	 Volume	 5,840,000	 3,091,000

Table XIII.
 Daily Flow Data Recorded at
 Ponds C-1 and C-2 during September, 1987
 (Woman Creek)

<u>Date</u>	Pond C-1 <u>(gallons)</u>	Pond C-2 <u>(gallons)</u>
9/01/87	106,000	-
9/02/87	88,000	-
9/03/87	62,000	-
9/08/87	256,000	-
9/09/87	64,000	-
9/10/87	-	2,265,000
9/11/87	2,000	1,296,000
9/14/87	274,000	-
9/15/87	40,000	-
9/16/87	78,000	-
9/17/87	87,000	-
9/18/87	142,000	-
9/21/87	1,481,000	-
9/22/87	630,000	-
9/23/87	684,000	-
9/24/87	688,000	-
9/25/87	698,000	-
9/28/87	2,018,000	-
9/29/87	692,000	-
9/30/87	636,000	-
Total Volume	8,732,000	3,561,000